

News and Views

A View on the Science: Physical Anthropology at the Millennium

RICHARD W. WRANGHAM

*Department of Anthropology
Harvard University
Cambridge, MA 02138*

EDITOR'S NOTE The year 2000 marks the onset of the 21st century. Physical anthropologists will provide brief reflections on our discipline, including what attracted them to it, and their views on the directions our discipline may pursue as we enter, in

January 2001, the third millennium. *Am J Phys Anthropol* 111:445–449, 2000.

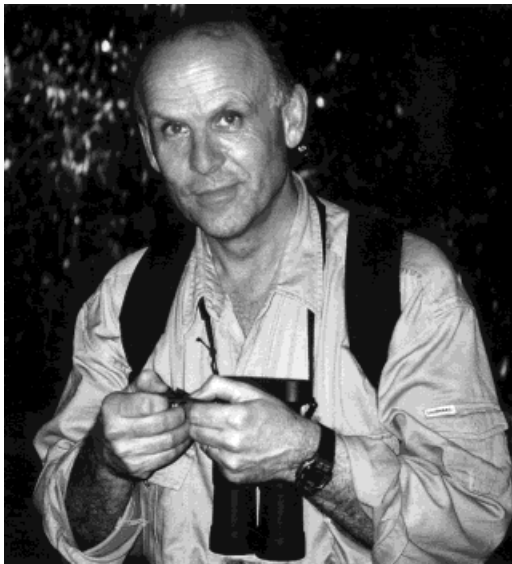
© 2000 Wiley-Liss, Inc.

THE OTHER APES; TIME FOR ACTION

New Year's Day 2000, an excuse for millennial thoughts. How soon will the old antagonisms of biology and culture turn to mutual respect, even to celebration? In time to help the other apes?

A lingering cartesianism

Consider a Martian visiting committee, reviewing anthropology's progress after its first hundred and fifty years. They might congratulate us on recognizing our morphological and evolutionary proximity to the apes, but wouldn't they wonder at the persisting anthropocentricity that so often causes a false dichotomy between us and our cousins? As interplanetary biologists, they would puzzle at the widespread notion that behavior which varies across human populations can't have been influenced by genes, unlike other animals; or at the fact that even though primatology's *raison d'être* is to shed light on humanity, most comparative primate studies exclude data on humans. Looking at the range of earth's species and their many differences, they would surely be startled that conventional anthropological wisdom often deems human social structure infinitely variable, whereas all other species are granted their typical social forms. Noting the human pervasiveness of fission-fusion grouping and male-bonded communities, patriarchy and war—a combination strikingly similar to traits among chimpanzees—they would be surprised that we don't yet have a unified theory of ape and human social evolution. And surely, they would lament a species that allows its nearest relatives to slide to extinction without a determined howl at the tragedy of the loss.



Richard Wrangham is Professor of Anthropology at Harvard University. He is interested in the behavioral ecology of primates, including humans and human ancestors. He studied chimpanzee behavior in Gombe National Park (Tanzania), and in Kibale National Park (Uganda), where he has co-directed the Kibale Chimpanzee Project for research and conservation since 1987, together with Dr. G. Isabiriye-Basuta. He received a MacArthur Foundation Fellowship (1987–1992), the Rivers Medal from the Royal Anthropological Institute of Great Britain (1993), and a Fellowship in the American Academy of Arts and Sciences (1993). In 1996 he and Dale Peterson wrote *Demonic Males: Apes and the Origins of Human Violence* (Houghton Mifflin).

**The ultimate causes of social life:
deductions from chimpanzee
soap operas**

My path to appreciation of the apes began at the age of 17, when on a whim I bought S.A. Barnett's edited collection, "A Century of Darwin," and discovered the thrill of evolution's explanatory power. Doubtless I didn't understand the arguments very deeply, but they were wildly superior to abstract philosophy or religious cosmology. I determined to experience African wildlife and then to major in zoology. I was lucky to find a job—it paid a shilling a day—assisting a biologist in Zambia. John Hanks was studying the social system of waterbuck, a slow-moving antelope. For several months I watched habituated waterbuck, and it is to those hot, bright, long, bush hours in my late teens that I trace a lifelong interest in the ultimate causes of social life. Plains animals are easy to study because their lives are so public. There were obvious lessons about how females moved to the fresh grass, while males strategized to stay with them. The evening talk was of Y33's fight with RB, and where GL had crèched her infant, and why the bachelors had crossed the river. The importance of individual strategies was as clear as the primacy of females in the design of social life.

If this seems remote from anthropology, it was. But student life at Oxford in the late 1960s was full of wonderfully fundamental ideas about humans. Robert Ardrey, Konrad Lorenz, and Desmond Morris were the talk of the town because of their clear-eyed and provocative biological narratives of human social behavior (Ardrey, 1961, 1966; Lorenz, 1967; Morris, 1967). These authors subjected human aggression, mating, and friendship to the same cool evolutionary analyses that biologists were beginning to apply to other animals. In doing so they captured the imagination of the public and foreshadowed the rise of a more serious behavioral ecology.

Most professionals, admittedly, were not amused. These popularly written scenarios of human evolution were full of holes. Much of their biology and anthropology was dubious, and they had an alarming whiff of

genetic determinism. But there was inspiration in the vision of uniting paleoanthropology with studies of living animals, and fortunately there was serious science available in the University to balance the speculation. Niko Tinbergen and David Lack were teaching: Tinbergen, a founder of ethology (Tinbergen, 1964), and Lack, the ecologist who explained bird mating systems in terms of individual food-finding (Lack, 1968). I planned a PhD in animal behavior, hoping to work with a diurnal social carnivore that might serve as a model for human ancestors. Banded mongooses were a possibility.

But my plans changed overnight, when my advisor, Harold Pusey, told me that his daughter Anne was going to work with Jane Goodall, and suggested that I ask Goodall for a job as a research assistant. She happened to need help, so by sheer luck, the end of 1970 found me in Gombe observing chimpanzees. I hadn't read a word about apes in college, but I soon learned how wrong the cartesian barrier between humans and other animals feels. Every day in the company of wild chimpanzees offered a sense that anything might happen, from invention to insight to understanding. The chimpanzees had expressive emotional lives and strong, clear, resonant personalities. Their changing relationships made a terrific daily soap opera. Their interactions could involve several individuals and sometimes appeared to incorporate events over many days. The complexity of alliances, grudges, and tenderness made this a dramatically different world from an antelope's.

In 1970, observers were just beginning to conduct all-day observations on individual chimpanzees, and my job was to document sibling relationships. It was immediately apparent that the mood and activity level of the day would be dictated by the sex and status of the individual I was observing. While the mothers were relatively sedentary and reserved, the males were boisterous and gregarious. At the same time, the social lives of both sexes were strongly influenced by the changing seasons of fruit production. Thrilled at the chance to explore such fundamental issues, I planned a study of seasonal variation in female behavior. I was talked out of it, however, because fe-

males vary so much in their reproductive states that extrinsic influences would be relatively hard to detect. So I worked on the same question with males instead, and it would be twenty years before I returned to the questions about females; questions I still pursue.

Apes: anthropology's luck

My transforming journey into the world of wild chimpanzees was unplanned and undeserved. I think of it as a private metaphor for a parallel piece of luck for anthropology. It's not merely that we have three particularly close ape relatives—gorillas, chimpanzees, and bonobos—but also that these species have apparently evolved rather little in the last five to ten million years. They have changed much less than we have, for example. It didn't have to happen that way. Our own species might easily have been more like coelacanths, isolated members of a deep taxon with no relatives sufficiently close to say much about our pre-history. Or we could have had a bevy of close kin who had diverged so much from each other that none of them was informative about our ancestors. But by happy chance, the living African apes are so fundamentally similar to each other in their biology and morphology that they portray a clear common heritage: the ape essence on which our subsequent pre-human existence was built. Even more than Darwin or anyone else realized until recently, this means that we can use the living apes to reconstruct our ape past, to think about why we diverged, and to consider what we were like as we did so (Pilbeam, 1996).

However, we can't reconstruct our ancestors simply by virtue of features held in common between apes and humans, because many traits vary among living apes. For example, the only two species of mammals in which males are known to live with their relatives, and occasionally launch lethal raids on neighboring groups, are humans and chimpanzees. Whether our common ancestor shared the habit of lethal raiding, or which other ancestors did so, will remain uncertain until we understand why lethal raiding is favored (or not) in living species (Wrangham, 1999). The same ap-

plies to other features shared between humans and apes, such as hunting, or a rich set of behavioral traditions, or learned styles of communication, or an incipient theory of mind (Hare et al., in press; Marshall et al., 1999; McGrew, 1992; Stanford, 1998; Whiten et al., 1999). So the differences among the three African apes are highly informative, because they are large enough to provide specific ideas about the ecological and social pressures that shaped the surviving species from a single ancestor. These ideas can be tested by studies of the living apes, using different habitats to provide different selection pressures. Our search for the sources of our own existence is made enormously easier by the happenstance that four other great apes are still alive.

Humans versus apes: the contrast between intellectual interest and species survival

Each year thousands of African apes are killed for the pot, and hundreds of orangutans die in the service of the pet trade (Bowen-Jones and Pendry, 1999; Wilkie et al., 1992). The ape range countries have the world's highest rates of human population growth and of forest loss, so it's not surprising that a litany of problems affects even the best-protected sites, which are those with longterm research. To take a few current examples, Indonesian orangutans in Tanjung Puting, Gunung Palung, and Ketambe are all under immediate threat from logging, and a population newly found to use tools in north Sumatra seems likely to be already extinct (Rijksen and Meijaard, in press; C. van Schaik, pers. comm.). Seven habituated groups of gorillas in the Democratic Republic of the Congo's Kahuzi-Biega were slaughtered during military conflict last year (J. Yamagiwa pers. comm.), just like the many gorillas converted to food for logging crews and middle-class restaurants in central Africa. Snaring has begun in Gombe, where Goodall considers the chimpanzees too few and isolated to survive for long. Several populations of the newly proposed Nigerian subspecies of chimpanzees, *P.t. vellerosus*, are apparently already extinct in the wild, less than a decade after being documented. In the Ivory Coast,

poaching, logging, and human diseases are fast reducing the population of Tai's nut-cracking chimpanzees. Bonobos live only in the Democratic Republic of the Congo, and don't look safe anywhere. Even in Wamba, where bonobos have been studied since 1974 and there used to be a food taboo, they live in a forest newly depleted of other large mammals, and have themselves been the targets of hunters since 1994. Orangutans and bonobos, each with just a few thousand individuals worldwide, will presumably go first. Within a few decades gorillas, perhaps 100,000 now, will be lucky to have any strongholds. Chimpanzees, now twice as numerous as gorillas, will last the longest. But even merely stabilizing the rate of loss will take a massively increased effort that combines education, resources, and imagination. Weighed down by their very slow rates of reproduction, their needs for large areas to live in, their conflicts with humans over land, and their popularity as food and pets, the great apes can't hope to survive without serious help from their kin (Peterson and Goodall, 1993).

The need for a planetary action plan

So three tasks loom, each one supporting the other two.

First, anthropologists can extol the great apes to the policy-makers—whether to voters or presidents, NGOs or governments, range countries or international institutions. We can help end the debates over whether it's culturally legitimate to eat great apes, or whether it's right to give great apes conservation priority over other mammals. We shouldn't eat apes, and we should give them special attention.

Second, we can encourage new field studies. Even if most of the extant populations will be gone within a few short decades, those being studied will last the longest, because researchers keep monitors in the field and enlarge the constituency of interest and support.

Third, there is much to be learned before the opportunities evaporate. Great apes have been studied in the wild for 40 years, less than a chimpanzee lifetime. There are whole subspecies still essentially untouched: neither western gorillas nor central chim-

panzees has yet had a population habituated in the wild. We have only the most elementary understanding of their ecology (such as why gorillas grow faster than chimpanzees), cognitive abilities (such as the meanings of their calls), reproductive strategies (such as what they know about paternity), cultures (such as whether traditions include social rules), parental influence (such as how much teaching occurs), or what they understand about each other (the extent of their theory of mind). Our explanations for their societies still hold huge gaps (such as why male orangutans don't commit infanticide, and why females tolerate forced copulations; or why extra-community copulations are favored among chimpanzees, and why males sometimes kill neighboring females; or why bonobos don't hunt monkeys, or are always as peaceful as they seem). Non-invasive studies of genes, diseases, hormones, diet, and nutritional status are opening new directions. We have barely begun to attempt an integrated theory of ape social adaptations, or to understand how human relationships can be analyzed in similar ways to the apes, or to think seriously about how ape social life became transformed into human cultures. We have largely accepted our physical evolution from apes, but we have yet to accommodate the reality of our ape biology for our social world. Our visiting committee would surely raise some Martian eyebrows.

Humans are mammals, primates, catarrhines, and great apes. We can relish the species that most closely share the dawning of our consciousness, or we can let them go. While we're pondering, the forests are falling and the apes are dying. It's up to evolutionary anthropologists, as much as anyone, to take the battle to the halls of government. Let us be bold. There's an international agreement not to hunt whales and dolphins. Why not an equivalent for the great apes? Can we persuade the United Nations to make the great apes the first World Heritage Species?

It's time for a planetary agreement to protect and cherish the great apes. The sooner we get it, the more it will be worth. Every day counts.

LITERATURE CITED

- Ardrey R. 1966. *The territorial imperative*. New York: Atheneum. p 1–416.
- Barnett SA. 1958. *A century of Darwin*. London: Mercury. p 1–376.
- Bowen-Jones E, Pendry S. 1999. The threat to primates and other mammals from the bushmeat trade in Africa, and how this threat could be diminished. *Oryx* 33:233–246.
- Goodall J. 1986. *The chimpanzees of Gombe: Patterns of behavior*. Cambridge, Massachusetts: Harvard University Press. p 1–673.
- Hare B, Call J, Agnetta B, Tomasello M. in press, 2000. Do chimpanzees know what conspecifics do and do not see? *Animal Behavior*.
- Lack D. 1968. *Ecological adaptations for breeding in birds*. London: Methuen. p 1–409.
- Lorenz K. 1966. On aggression. Translated by Marjorie Latzke. London: Methuen. p 1–273.
- Marshall A, Wrangham RW, Arcadi AC. 1999. Does learning affect the structure of vocalizations in chimpanzees? *Animal Behavior* 58:825–830.
- McGrew WC. 1992. Chimpanzee material culture: Implications for human evolution. Cambridge University Press. p 1–277.
- Morris D. 1967. *The naked ape: A zoologist's study of the human animal*. London: Jonathan Cape. p 1–252.
- Peterson D, Goodall J. 1993. *Visions of Caliban: On chimpanzees and people*. Boston, Houghton Mifflin. p 1–310.
- Pilbeam D. 1996. Genetic and morphological records of the Hominoidea and hominid origins: a synthesis. *Mol Phylogenet Evol* 5:155–168.
- Rijksen HD, Meijaard E. in press 1999. Our vanishing relative: the status of wild orangutans at the close of the twentieth century. Leiden: Backhuys Publishers.
- Stanford CB. 1998. *Chimpanzee and red colobus: The ecology of predator and prey*. Cambridge: Harvard University Press. p 1–296.
- Tinbergen N. 1964. *Social behavior in animals, with special reference to vertebrates*. 2nd edition. London, Methuen. p 1–150.
- Whiten A, Goodall J, McGrew WC, Nishida T, Reynolds V, Sugiyama Y, Tutin CEG, Wrangham RW, Boesch C. 1999. Chimpanzee cultures. *Nature* 399:682–685.
- Wilkie DS, Sidle JG, Boundzanga GC. 1992. Mechanised logging, market hunting, and a bank loan in Congo. *Conservation Biology* 6:570–580.
- Wrangham RW. 1999. The evolution of coalitionary killing. *Yearbook of Physical Anthropology*, 42:1–30.